REMARKS

Applicants respectfully request reconsideration of the present application in view of the reasons that follow.

No claims are amended.

A detailed listing of all claims that are, or were, in the application, irrespective of whether the claim(s) remain under examination in the application, is presented, with an appropriate defined status identifier.

Claims 1-13 are now pending in this application.

Improper nature of final rejection

Applicants submit that the finality of the outstanding Office Action (mailed March 8, 2005) is improper and respectfully request that the finality be reconsidered and withdrawn. The finality of the outstanding Office Action is improper because the Examiner has introduced a new ground of rejection, at least with respect to claims 1-2 and 5-13, where the new ground of rejection was not necessitated by an amendment to these claims (See MPEP 706.07(a)). Claims 1-2 and 5-13 were rejected based on the following new ground of rejection: under 35 U.S.C. 103(a) as being unpatentable over EP 1,174,600 A2 to Kobayashi et al. ("Kobayashi") in view of U.S. Patent No. 5,974,791 to Hirota ("Hirota"). Claims 1-2 and 5-13, however, were not amended in the Amendment and Reply filed on February 1, 2005 to which the outstanding Office Action is in response. Thus, the finality of the outstanding Office Action is premature, and applicants respectfully request that the finality be withdrawn.

Rejections under 35 U.S.C. § 103

Claims 1, 2 and 5-13 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over EP 1,174,600 A2 to Kobayashi et al. ("Kobayashi") in view of U.S. Patent No. 5,974,791 to Hirota ("Hirota"). Claims 3 and 4 stand rejected under § 103(a) as being unpatentable over Kobayashi in view of certain legal precedent. Applicants respectfully traverse these rejections for at least the following reasons.

The device of claim 1 is configured to perform lean air-fuel ratio operation of a diesel engine when a trapped amount of particulate matter in a filter becomes sufficiently large, even when the engine is operated with a rich air-fuel ratio for the purpose of eliminating sulfur oxide poisoning of the catalyst. Once the particulate matter is reduced sufficiently, rich air-fuel ratio operation is resumed. In this regard, the device of claim 1 includes a programmable controller programmed to "control the mechanism to cause the exhaust gas composition to be in a state corresponding to the lean air-fuel ratio, when the particulate matter trap amount has reached the predetermined amount during a period when the exhaust gas composition is in a state corresponding to the rich air-fuel ratio" and "control the mechanism to cause the exhaust gas composition to be in a state corresponding to the rich air-fuel ratio, when the particulate matter trap amount has reached the predetermined decrease state during the period when the exhaust gas composition is in the state corresponding to the lean air-fuel ratio."

In contrast to claim 1, Kobayashi does not suggest controlling an air-fuel ratio mechanism to be in a lean air-fuel state when a particulate matter trap amount reaches a predetermined amount during the time the air-fuel ratio is rich, such as during sulfur oxide poisoning elimination, and then, when the particulate matter trap amount reaches a decreased state, controlling the air-fuel ratio to be rich again, such as to resume sulfur oxide poisoning elimination. Instead, Kobayashi discloses a process to eliminate sulfur oxide poisoning <u>only after</u> particulate filter regeneration is completed.

The Office Action, citing to paragraphs [0119] and [0101] of Kobayashi, appears to suggest that Kobayashi discloses interrupting the process of sulfur oxide poisoning elimination to begin a process of particulate filter regeneration, and then resuming the process of sulfur oxide poisoning elimination. Applicants respectfully disagree.

Figure 4 of Kobayashi provides a flow chart describing a process according to a second embodiment, which includes the description in the cited paragraphs [0119] and [0101] (<u>See</u> col. 18, paragraph [0091]). Figures 5-7 are flow charts showing details of steps 402-404 of the Figure 4 flow chart.

As is clear from Figure 4 and the describing text of Kobayashi, elimination of sulfur oxide poisoning is performed only after regeneration of the particulate filter. As shown in Figure 4, when it is determined that sulfur oxide poisoning elimination is required in the first step S401, the amount Gp of accumulated particulate matter is calculated in the step S402 using the sub-routine of Figure 5. In the next step S403, an instantaneous target temperature ti is determined applying the sub-routine of Figure 6. In the steps S404-S406, the temperature is continuously raised until the instantaneous target temperature becomes equal to the final target temperature Tf. Only after the determination in the step S405 becomes affirmative, in other words, only after the accumulated particulate matter has been removed, is elimination of sulfur oxide poisoning performed in step S407.

Significantly, the flow chart in Figure 4 does not show that regeneration of the particulate filter is performed after step S407, followed by a repeat of step S407. In the flowchart of Fig. 4, even when the sulfur oxide poisoning elimination of the NOx catalyst is required, the accumulated particulate matter is first removed, and only after the removal of the accumulated particulate matter, is sulfur oxide poisoning elimination performed. After performing the sulfur oxide poisoning elimination, the process is terminated.

Paragraphs [0119] and [0101] of Kobayashi cited in the Office Action do not suggest that sulfur oxide poisoning elimination is performed before particulate filter regeneration. Paragraph [0119] recites:

> In the second embodiment, the recovery-process terminating means is activated to terminate or inhibit the process to recover the NOx catalyst 17 from the S poisoning when the particulate-amount detecting means determines that the amount of the accumulated particulate matters is larger than the predetermined threshold value. In this case, the particulate matters are removed by burning or oxidation, and then the S-poisoning recovery process is implemented by the S-poisoning recovery means, so that the particulate filter 18 is protected from thermal deterioration due to an excessive temperature rise of the exhaust gas by burning of an excessively large amount of the particulate matters.

Paragraph [0101] recites:

> Step 505 is executed to determine whether the difference (pd'-Pd) obtained in step S503 is smaller than zero, namely, assumes a negative value, and whether the absolute value of this difference is larger than a predetermined threshold value. That is step S505 is

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provided to determine whether a difference (Pd-Pd') is greater than a predetermined threshold value. If this determination is affirmative, it is determined that the particulate filter 18 is deteriorated or defective. In this case, the process to recover the NOx catalyst 27 from the S poisoning is terminated. It will be understood that a portion of the ECU 9 is assigned to execute step S505 constitutes recovery process terminating means for terminating the process to recover the NOx catalyst 16 from the S poisoning. The ECU 9 including the ROM storing the routine of Fig. 5 including step S505 is considered to constitute the recovery process terminating means.

Paragraph [0119] and [0101] must be interpreted in light of the flow chart of Figure 4 and the remaining disclosure of Kobayashi to mean that when it is determined that a sulfur poisoning recovery process is required, and it is also determined that the particulate filter should be regenerated, the process of actually performing the sulfur oxide poisoning elimination is delayed until the particulate filter is regenerated. This interpretation is consistent with Kobayashi's disclosure that particulate filter regeneration must be performed before sulfur poisoning elimination to prevent the filter from being thermally deteriorated (See col. 22, paragraph [0120]). Performing sulfur oxide poisoning elimination before filter regeneration (as the Office Action suggests occurs) would be contrary to Kobayashi's teaching that such an order of processes may damage the filter.

Hirota also does not disclose that sulfur oxide poisoning elimination is performed before particulate filter regeneration, and then sulfur oxide poisoning elimination is resumed, and thus Hirota does not cure the deficiencies of Kobayashi.

Moreover, Kobayashi does not suggest in its system that sulfur oxide poisoning elimination should be interrupted for diesel particulate filter (DPF) regeneration. A large amount of particulate matter is discharged in a DPF during sulfur oxide poisoning elimination of the NOx catalyst due to the rich air-fuel ratio that is used in the elimination. Even if particulate matter in the DPF is removed prior to eliminating sulfur oxide poisoning in the NOx catalyst as in the second embodiment of Kobayashi, accumulation of particulate matter during the sulfur oxide poisoning elimination of the NOx catalyst cannot be prevented. With the device of the second embodiment of Kobayashi, if the accumulated amount of particulate matter reaches an upper limit during the elimination process of sulfur oxide poisoning in the NOx catalyst, particulate matter will no longer be trapped by the filter and will be discharged into the atmosphere thereafter.

To prevent such an accumulation of particulate matter in the DPF during the sulfur oxide poisoning elimination of the NOx catalyst, the amount of particulate matter trapped in the DPF should be monitored during elimination of the sulfur oxide poisoning of the NOx catalyst, and when it reaches the predetermined amount, elimination of the sulfur oxide poisoning of the NOx catalyst should be temporarily terminated, the trapped particulate matter in the DPF should be removed, and then the elimination of sulfur oxide poisoning in the NOx catalyst should be resumed. This control is accomplished by exhaust gas composition control as defined in Claim 1, i.e., changing the air-fuel ratio from rich to lean when the particulate matter trap amount has reached the predetermined value, and changing the air-fuel ratio from lean to rich when the particulate matter trap amount has reached the predetermined decrease state. Kobayashi does not disclose such a feature, and claim 1 is patentable thereover.

Independent claims 12 and 13 include limitations corresponding to those discussed above with respect to claim 1, and thus are allowable for analogous reasons. Dependent claims 2-11 ultimately depend from claim 1, and are patentable for at least the same reasons, as well as for further patentable features recited therein.

Applicant believes that the present application is now in condition for allowance. Favorable reconsideration of the application as amended is respectfully requested.

The Examiner is invited to contact the undersigned by telephone if it is felt that a telephone interview would advance the prosecution of the present application.

The Commissioner is hereby authorized to charge any additional fees which may be required regarding this application under 37 C.F.R. §§ 1.16-1.17, or credit any overpayment, to Deposit Account No. 19-0741. Should no proper payment be enclosed herewith, as by a check being in the wrong amount, unsigned, post-dated, otherwise improper or informal or even entirely missing, the Commissioner is authorized to charge the unpaid amount to Deposit Account No. 19-0741. If any extensions of time are needed for timely acceptance of papers submitted herewith, Applicant hereby petitions for such extension under 37 C.F.R. §1.136 and authorizes payment of any such extensions fees to Deposit Account No. 19-0741.

Respectfully submitted,

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By [signature]

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